

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of Eiju SUZUKI, et al.

Application No.: 10/562,947

Filed: December 30, 2005

For: RUBBER COMPOSITION AND TIRE USING THE SAME

Group Art Unit: 1791

Examiner: Justin R. Fischer

Confirmation No.: 8599

DECLARATION UNDER 37 C.F.R. § 1.132

I, Eiju Suzuki, declare that:

I am one of the inventors of the above-captioned patent application.

I received my Master of Science and Technology from Keio University in 2002, and have been employed by Bridgestone Corporation since 2002, where I have been engaged mainly in research and development of new polymers.

I have made the following experiments in order to evaluate the processability, the wear resistance and the durability of the rubber composition comprising as a rubber component (A) a synthetic polyisoprene rubber having a cis-1,4-bond content of not less than 99.0%, a 3,4-bond content of not more than 0.5% and a Mooney viscosity ML₁₊₄ (100°C) of 20-110 and (B) a natural rubber, wherein a ratio by mass of (A) the synthetic polyisoprene rubber to a total of (A) the synthetic polyisoprene rubber and (B) the natural rubber is less than 5 mass% or more than 60 mass%.

Experimental Procedure

(Additional comparative examples A and B)

<Preparation of Rubber composition>

By using the polyisoprene rubber prepared through the method described in paragraph [0028] in the specification of the present application, a rubber composition is prepared according to a compounding recipe shown in the following Table A.

<Evaluation of properties of rubber composition>

With respect to the resulting rubber compositions, the processability, wear resistance and durability of the rubber composition are evaluated according to the methods described in paragraphs [0032]-[0034] in the specification of the present application. Results obtained from these experiments and the results described in the present specification are summarized in the following Table A.

Table A

	Example 1	Example 2	Example 3	Additional Comparative Example A	Additional Comparative Example B	Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4	Comparative Example 5	Comparative Example 6
Natural rubber (RSS#3)	90	75	50	97	35	90	75	50	-	-	100
Polyisoprene rubber A *1	10	25	50	3	65	-	-	-	100	-	-
Polyisoprene rubber B *2	-	-	-	-	-	10	25	50	-	100	-
Formulation	Carbon black *3 mass	50	50	50	50	50	50	50	50	50	50
	Stearic acid	2	2	2	2	2	2	2	2	2	2
	Antioxidant 6C *4	1	1	1	1	1	1	1	1	1	1
	Zinc oxide	3	3	3	3	3	3	3	3	3	3
Vulcanization accelerator DZ *5	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Sulfur	1	1	1	1	1	1	1	1	1	1	1
Evaluation	Processability index	112	121	138	102	140	108	109	115	143	126
	Wear resistance	101	99	99	101	97	99	97	93	97	85
	Durability	97	94	90	97	89	87	84	79	86	70

*1 Produced by the Production Example 1 of Polyisoprene described in paragraph [0028] in the specification of the present application, cis-1,4-bond content=99.6%, 3,4-bond content=0.4%, $ML_{1+4}(100^{\circ}\text{C})=81$.

*2 IR2200, made by JSR Corporation, cis-1,4-bond content=98.0%, 3,4-bond content=2.0%, $ML_{1+4}(100^{\circ}\text{C})=82$.

*3 N339, made by Tokai Carbon Co., Ltd. $N_2SA=93\text{m}^2/\text{g}$.

*4 N-(1,3-dimethylbutyl)-N'-phenylenediamine, made by Ohuchi Shinkou Kagaku Co., Ltd., Nocrac 6C.

*5 N,N'-diethylhexyl-2-benzothiazolyl sulfenamide, made by Ohuchi Shinkou Kagaku Co., Ltd. Nocller DZ.

(Summary)

As seen from the result of the additional comparative example A, when the ratio of (A) the synthetic polyisoprene rubber is less than 5 mass%, the effect by compounding (A) the synthetic polyisoprene rubber is little and the processability is hardly improved, and hence the balance between the dynamic properties and the processability is not improved.

Further, as seen from the result of the additional comparative example B, when the ratio of (A) the synthetic polyisoprene rubber exceeds 60 mass%, the wear resistance and the durability of the rubber composition are deteriorated.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 10 - 5 - 2009Declarant: Eiju Suzuki
Eiju Suzuki